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ABSTRACT

This module on basic metal repair is the third of four (CE 028 303-306) in the auto body repair course of a bilingual vocational training program. The course is designed to furnish theoretical and laboratory experience in welding, metal straightening, metal finishing, painting, and use of power and hand tools. Module objectives are for students to develop trade-related Spanish/English vocabulary; to identify procedure for preparing exterior, interior, and under surfaces and for analyzing damage; to identify metal capabilities; and to identify these processes: metal roughout, metal shrinking, soldering, plastic filler, metal finishing. Contents include list of module objectives; pretest; five sections on (1) surface preparation, (2) damage analysis and metal roughout, (3) metal shrinking, (4) body solder and plastic filler, and (5) metal finishing; posttest; and English/Spanish vocabulary list. Each section is organized into this format: instructions, vocabulary, and concepts (statements or questions to direct reading) presented in English and Spanish; readings; and worksheets to evaluate comprehension of the trade-related reading material. Worksheets also cover these areas: vocabulary, definitions, word attack skills, writing skills, spelling, and application of terminology to the trade area. (YLB)

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BILINGUAL SKILLS TRAINING PROGRAM

AUTO BODY REPAIR
MODULE 3.0

BASIC METAL REPAIR

CE 028 305

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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NORTHERN NEW MEXICO COMMUNITY COLLEGE

EL RITO, NEW MEXICO 87530

3.0 AB

MODULE CONTENTS

3.1 Surface Preparation

3.2 Damage Analysis and Metal Rough Out

3.3 Metal Shrinking

3.4 Body Solder and Plastic Filler

3.5 Metal Finishing

MODULE OBJECTIVES

1. To develop trade related Spanish/English vocabulary

2. To identify procedure for preparing exterior, interior and under surfaces

3. To identify procedure for analyzing damage

4. To identify metal capabilities

5. To identify metal rough out process

6. To identify metal shrinking process

7. To identify soldering process

8. To identify plastic filler process

9. To identify metal finishing process

AUTO BODY REPAIR

Auto Body Repair is designed to furnish theoretical and laboratory experience in welding, metal straightening, metal finishing, painting and the use of power and hand tools. Shop procedures and equipment, common to that of the industry, are emphasized. Conditions and assignments are similar to those of a full time Auto Body repair shop.

ACTIVITIES

To clarify the purpose of each reading, the instruction, vocabulary and concepts are presented in Spanish and English.

Readings are followed immediately by a series of diversified work-sheets which evaluate comprehension of trade related material.

Oral language development exercises, directed by the instructor, are presented to reenforce written concepts. Students are encouraged to utilize and expand their technical vocabulary by engaging in discussion with other students, the instructor and the tutor.

Audio visual materials are utilized to introduce subject matter. These materials are readily available to students and may be used on an individual or group basis.

Students are directed to utilize supplementary material available in the Learning and Resource Center, and as a result reenforce concepts presented in the module.

EVALUATION

Module Pre-Test	(Any student who scores 90% or below will complete entire module)
Module Post-Test	(Any student who scores 90% or below will repeat areas where improvement is necessary)
Wroksheets	
Oral Exercises	
Supplementary materials	

1. Describe procedure used in surface preparation.

2. Define the following:
   A. Direct damage
   B. Indirect damage
   C. Direction of damage

3. Name metal capabilities _____, _____ and _____.

4. Describe the metal rough out process.

5. Name and describe two methods used in shrinking metal.

6. List steps which should be followed when applying solder.
   1.
   2.
   3.
   4.

7. List steps which should be followed when applying plastic filler.
   1.
   2.
   3.
   4.

8. List three grinding and three filing methods used in metal finishing

Grinding	Filing
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____

Instructions:

The following reading contains information on surface preparation. Read it carefully then answer the exercises.

Instrucciones:

La siguiente lectura contiene información tocante la preparación de la superficie. Léala cuidadosamente y luego conteste los ejercicios

Vocabulary	Vocabulario
interior	interior
exterior	exterior
surface	superficie
detergent	detergente
tar	brea
oxyactylene	oxiacetilénico
scraper	rascador

Remember the following.
Recuerde lo siguiente.

1. The procedure used to clean the exterior surface.
   El proceso que se usa para limpiar la superficie exterior.

2. The procedure used to clean the interior surface.
   El proceso que se usa para limpiar la superficie interior.

Surface Preparation

Upon receiving a damaged vehicle the technician must assess the damage before attempting any repairs. To prevent an inaccurate assessment it is recommended that any damaged trim be removed. Removal should also include hardware and/or trim which may be damaged during repairs. Cleaning the panels' exterior, interior and undersurface of tar, mud, etc. will further assist the technician complete an accurate assessment.

Exterior surface refers to a panel's outer side which is easily seen. The interior surface refers to a panel's inner side which is not visible unless parts are removed. As an example, door trim pads have to be removed before the interior surface of a door panel becomes visible. The undersurface are exposed panel walls which are visible only from certain angles. An example of an undersurface is the exposed wall of a fender apron.

Exterior surfaces are cleaned with detergent and water. Foreign substances, such as tar which remain after cleaning, can be removed with wax and grease remover.

The under and exterior panel surfaces are usually factory coated with a sticky substance called undercoating. It is applied to surfaces which are exposed to water for protection against rust. The undercoating also serves as insulation which protect the passengers from excessive noise. This substance must be removed from a dented panel before repairs are attempted. Removal may best be accomplished by heating the exterior surface to loosen the undercoating. The softened coating is scraped off with a putty

knife. Great caution must be exercised to avoid excessive burning of paint.

Repairmen who follow the proper procedures in surface preparation will avoid making mistakes which may prove to be costly. Such mistakes may be paint failures caused by substances embeded in metal pores.

True or False

___1. After collision contact, the first step in repairing damage is removal of paint.

___2. Damaged trim should be removed in order to prevent incorrect assessment.

___3. Hardware and trim should be removed before any repairs are made.

___4. Water is the only substance necessary when cleaning panel surfaces

___5. Undercoating is removed with a putty knife after heating exterior surface.

Fill in the blanks

1. _____must be removed from panel surfaces before applying _____and _____removers.

2. By _____and _____panel surfaces a repairman provides a clean working surface which prolongs _____and disc life.

3. Undercoating is a _____ _____substance applied to the _____or undersurface of a panel to protect against _____.

Circle the correct word

1.	intireor	interoir	interior
2.	sirface	surface	serface
3.	detergent	diteargent	detergant
4.	screper	scrapre	scraper
5.	exterior	extearor	exteroir
6.	reparman	repiarman	repairman
7.	undercoating	undercaoting	undurcoating
8.	tecnichen	technetion	technician
9.	removal	removel	removul
10.	hardwear	harware	hardware

Instructions:

The following reading contains information on metal rough out. Read it carefully then answer the exercises.

Instrucciones:

La siguiente lectura contiene información tocante el proceso de como enderezar el metal a condición básica. Léala cuidadosamente y luego conteste los ejercicios.

Vocabulary	Vocabulario
elasticity	elasticidad
deformation	deformación
hardening	endurecer
direct	directo
indirect	indirecto
buckle	encorvadura

Remember the following.
Recuerde lo siguiente.

1. The metal properties.
   Las calidades del metal.

2. How to analyze damage.
   Como analizar daño.

Damage Analysis and Metal Rough Out

Before the repair process is begun the auto body technician must analyze the damage. During the analysis the repairman looks for stretched or shrunken metal and the areas which will offer the greatest resistance to corrective forces. He must also decide on the most effective methods and the tools best suited for repairing the damaged areas. The following should be considered when assessing damage.

1. Direct damage - damage such as a tear, gouge, or scratch, which resulted from direct contact with an impact object.
2. Indirect damage - damage, such as rolled or hinged buckles, caused to other areas when the force of the impact travels.
3. Direction of damage - is the direction in which the damage traveled from the point of impact.

During damage analysis the technician must also consider metal capabilities such as elasticity, elastic limit and work hardening. Elasticity refers to the property which allows metal to stretch and return to original form. Elastic limit refers to the point which metal can be stretched and still recover without damage. Work hardening refers to strengthening or hardening of metal by bending and forming it.

After damage analysis is completed the repairman proceeds to the metal rough out phase. Rough out is the process, used by auto body repairmen, in basic metal repair to return damaged panels to their approximate original dimensions. Hammers and dollies are used extensively during this stage. Two techniques of using these tools are:

The hammer on dolly technique which consists of placing the dolly under the damaged area and striking with a hammer directly above (see illustration page 13).

The hammer off dolly technique requires placing the dolly close to, but not directly under point being struck with hammer (see illustration page 4). These techniques are used to level and stretch metal so it will return to its original shape.

Small dents which are difficult to remove with the conventional dolly and hammer may be removed with the pick hammer. It is also employed when attempting to raise or lower metal bumps.

Any kind of metal repair, along with methods employed, require constant practice.

Fill in the blanks

1. The property which allows metal to stretch and _____to its _____position is referred to as _____.

2. The point to which metal can be _____and recover without _____is called _____limit.

3. Work _____refers to the ability of metal to be _____ or bent.

4. _____damage results from direct _____ with an _____object.

5. Damage caused to other areas, as a result of a traveling _____ from point of impact, is referred to as _____damage.

6. Direction in which the damage _____ from point of _____ is referred to as the _____of damage.

7. The process used by auto body repairmen, in basic _____ repair, to return _____panels to their _____ dimensions is referred to as _____.

Define the following:

direct damage

indirect damage

direction of impact

elastic limit

plastic deformation

work hardening

elasticity

rough out

hammer on dolly

hammer off dolly

True or False

_____1. When raising or lowering metal bumps, the hammer off dolly technique is employed.

_____2. There are five techniques of using a dolly and hammer.

_____3. Hammer on dolly is placing the dolly under metal and striking directly above it.

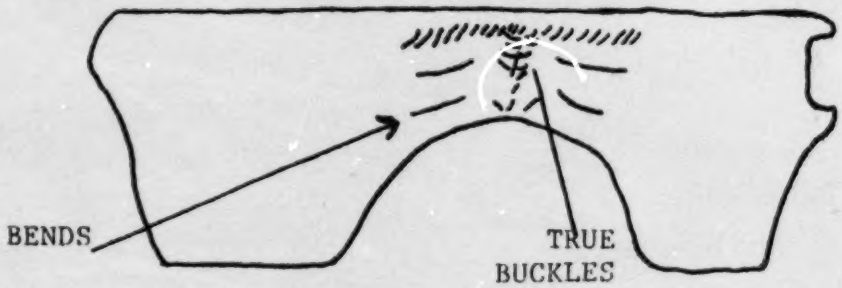
_____4. Hammer off dolly requires placing dolly close to but not directly under point being struck.

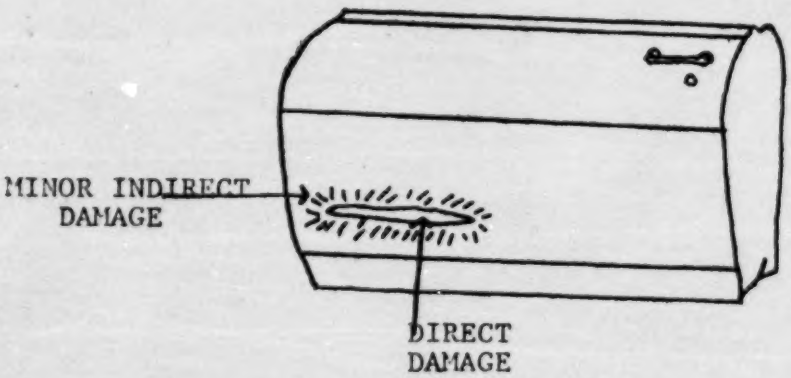
_____5. Dolly and hammer techniques are used to return damaged panels to original shape.

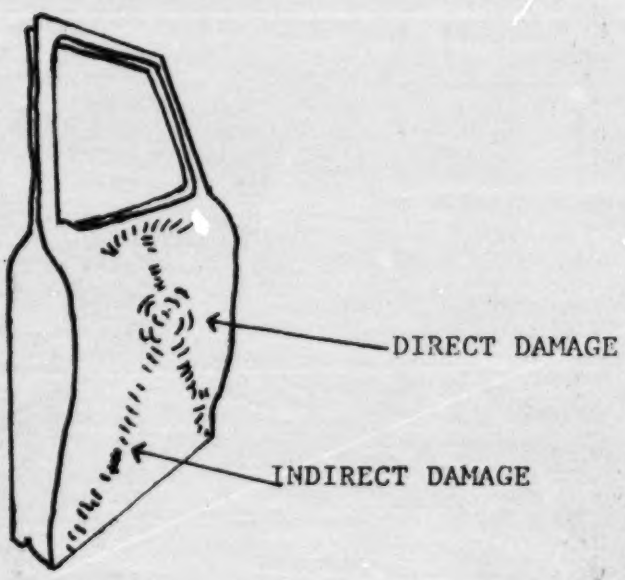
_____6. Roughing out is usually accomplished with a dolly and hammer.

_____7. Small dents that aren't able to be removed by the dolly and hammer technique may be removed with a pick hammer.

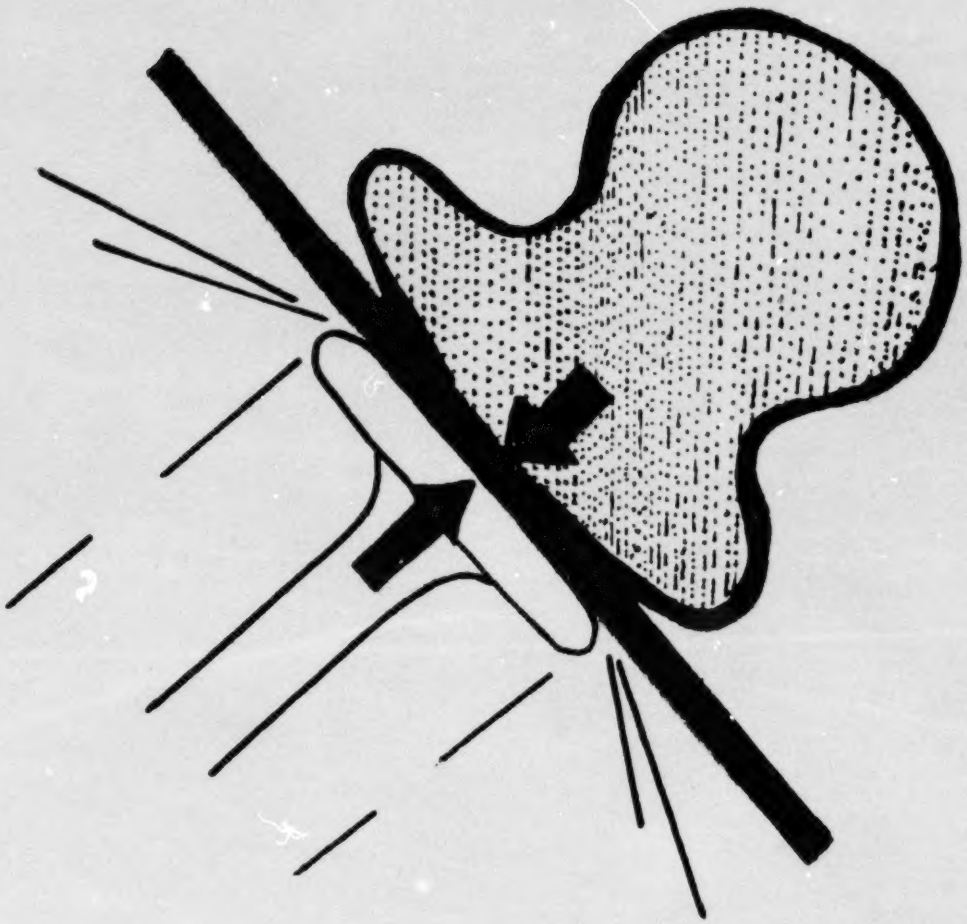
DIRECT, INDIRECT DAMAGE AND DIRECTION OF IMPACT



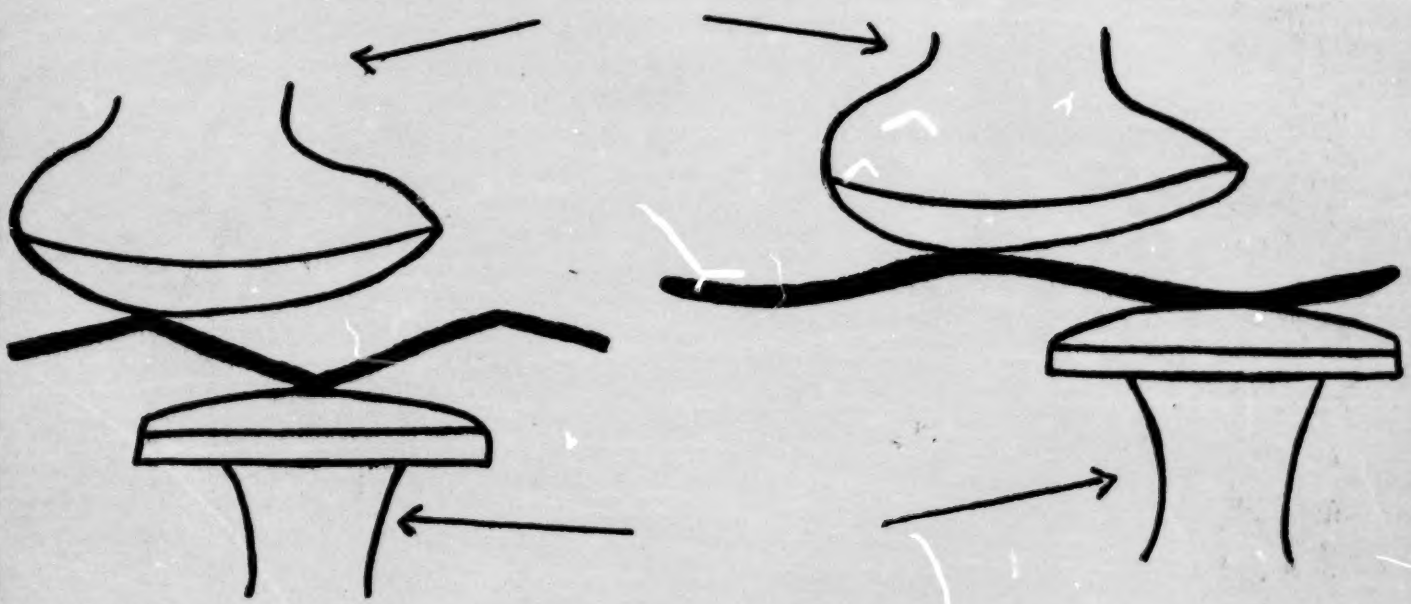




HAMMER ON DOLLY METHOD



HAMMER OFF DOLLY METHOD



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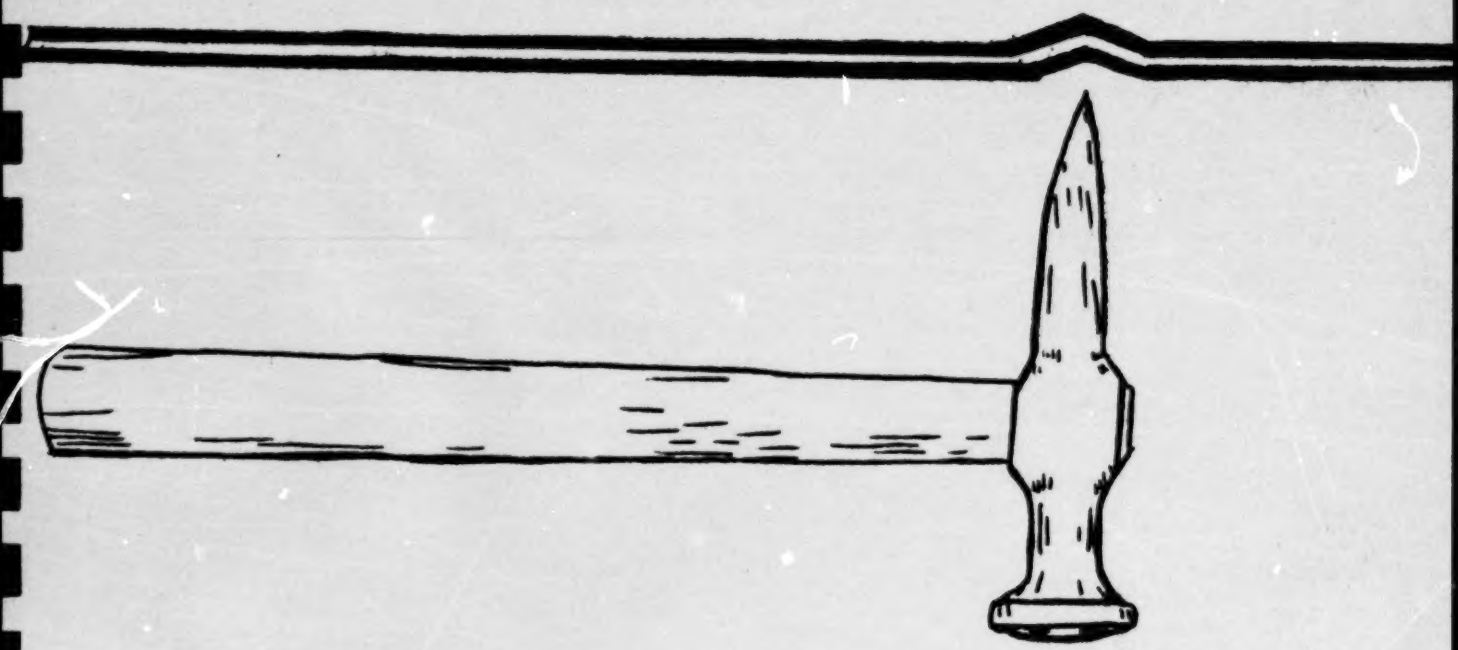
PICKING



Instructions:

The following reading contains information on methods used for shrinking metal. Read it carefully then answer the exercises.

Instrucciones:

La siguiente lectura contiene información tocante los modos que se usan para encoger metal. Léala cuidadosamente y luego conteste los ejercicios.

Vocabulary	Vocabulario
shrink	encoger
bulge	torcedura
molecule	molécula
disarrange	desarreglar
rearrange	volver a arreglar
pressure	presión
compress	comprimir

Remember the following.
Recuerde lo siguiente.

1. How to heat shrink metal.
   Como encoger metal usando calor.

2. How to cold shrink metal.
   Como encoger metal sin calor.

Metal Shrinking

Steel, used in making automobiles, is a mixture of iron and carbon molecules. It may be low or high carbon steel. Low carbon steel is used for auto body construction because it has a certain degree of stiffness yet it can be bent or formed without breaking. High carbon steel is used in items such as files, where extra strength is required.

Carbon and iron molecules are arranged in a certain order when the panels are formed. These molecules become disarranged on panels which are damaged as a result of collision. Improper repair methods, such as excessive hammering, may also cause the metal molecules to become disarranged. It becomes the repairman's job to rearrange them, this means bringing the damaged panel back to its original form.

Metal molecules which are severely stretched or disarranged must be shrunk to their original shape using heat. Those which have not suffered serious damage may be cold shrunk.

Hot shrinking is considered the best method of straightening metal because the molecules are softened by heat, making it easier to return the panel to its original shape. During this method, the high point of the bulge is heated to a bright red, then driven down with a shrinking hammer and dolly. The straightened metal is then quenched with cold water which aides in further shrinking and to cool the metal. Hot shrinking of gouged or raised metal is illustrated on page 22.

Cold shrinking involves striking the sheet metal with a shrinking hammer. Shrinking hammers have a cross grooved face.

These grooves are deep and when they strike the metal they leave square dots which in turn shrink metal. This method requires a dolly and is very useful in straightening small stretched areas and damaged high crown panels. High crown panels are easily cold shrunk. They have a pressure within them that respond well to the shrinking hammer and dolly.

Once the metal shrinking process is completed the technician is ready to fill with plastic and/or finish the panel in preparation for painting.

Fill in the blanks

1. Automobiles are made of _____which is a mixture of _____ and _____.

2. _____carbon steel is used for auto body _____because of its combined _____and versatility.

3. When panels are _____, as a result of a collision, metal _____become _____.

4. Metal _____which have been severely disarranged must be _____to their _____shape by using _____.

5. When employing the cold metal shrinking method,a shrinking _____ and _____are used.

6. High _____panels are easily _____shrunk.

Fill in the blanks

s__rin__ing	go__ged
cr__w__ed	__amm__r
b__lg__	m__lec__le
h__at	contr__ct
q__en__h	r__ar__ange

True or False

____1. Cold shrinking is considered the best shrinking method.

____2. In hot shrinking after bulge is heated to a bright red, the softened spot is driven down.

____3. During cold shrinking excessive blows may cause stretched portion to contract.

____4. During hot shrinking, after metal is straightened, cold water helps in further shrinking the metal.

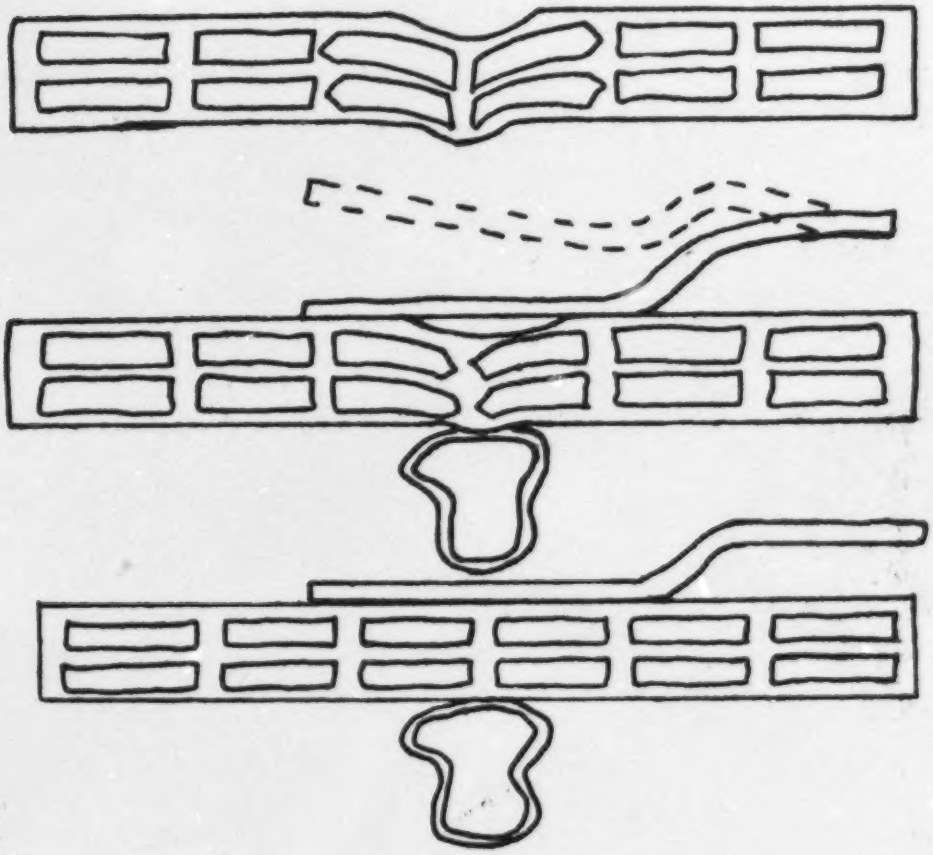
____5. The repairman's job is to rearrange the metal molecules.

Describe the following:

Cold shrinking

Hot shrinking

DISARRANGED

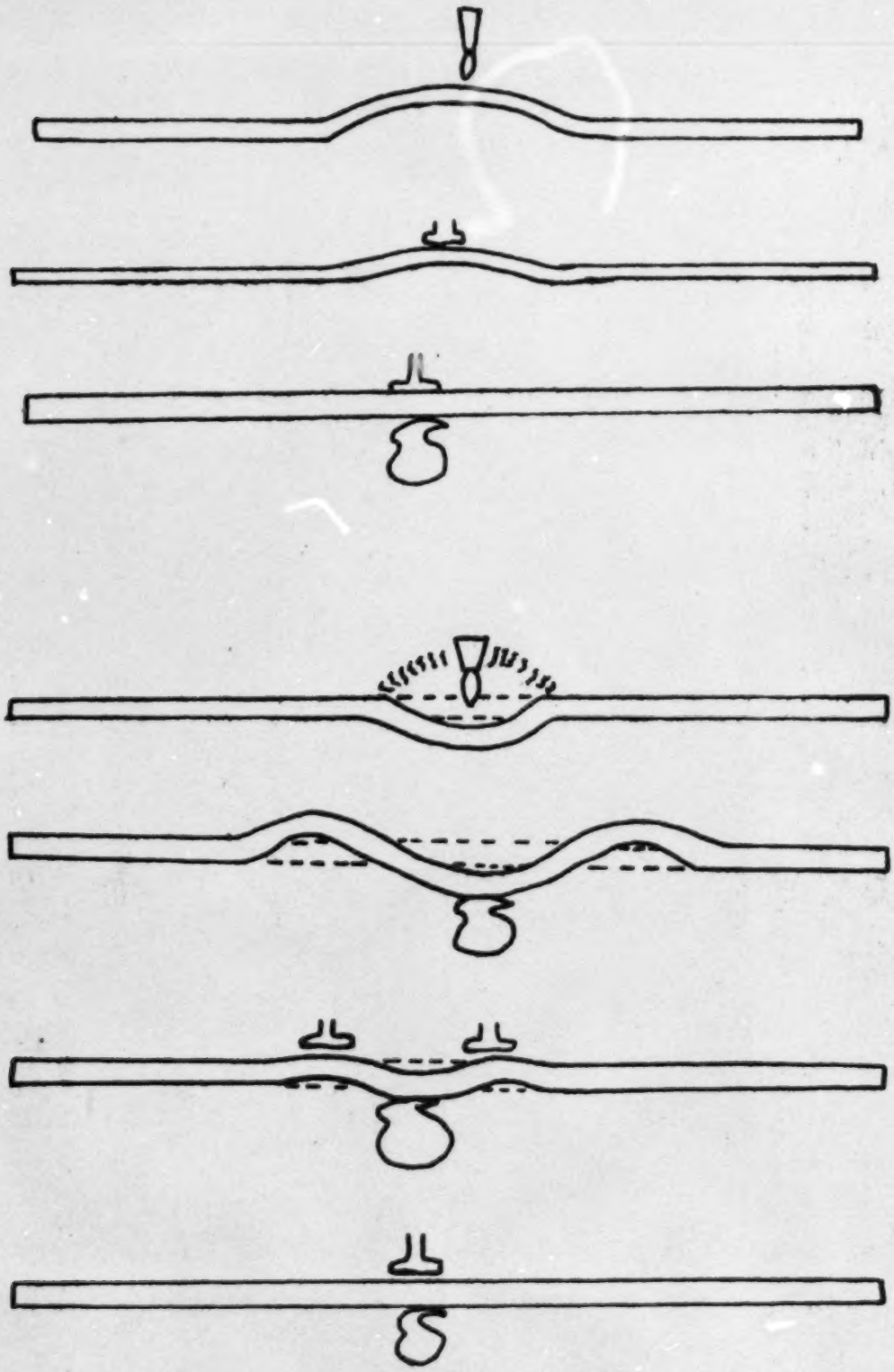


REARRANGED

HOT SHRINKING

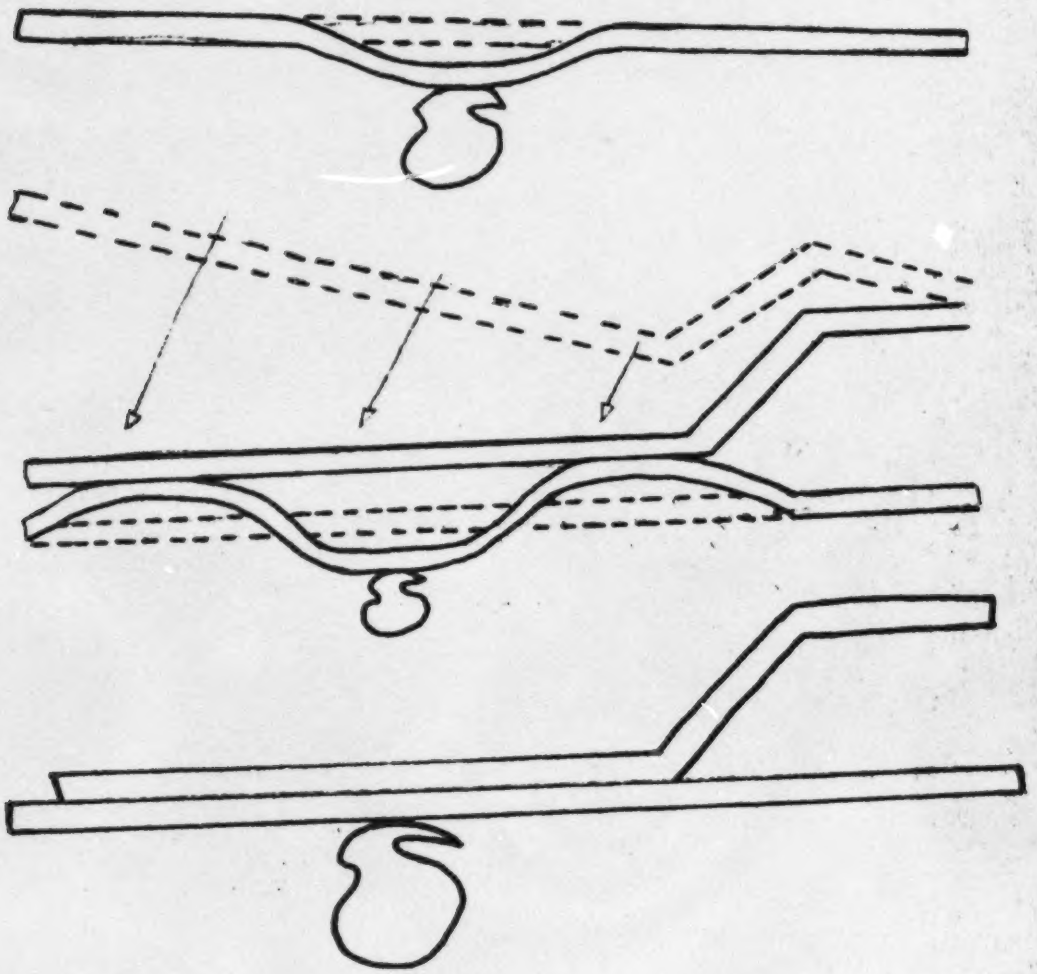
Raised Metal & Gouged Metal

3,3

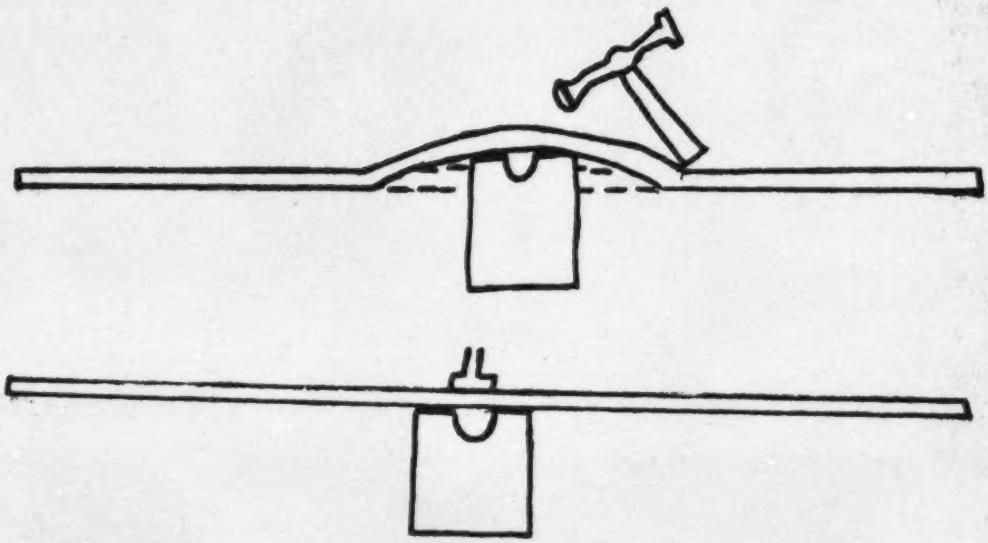


COLD SHRINKING WITH SLAPPING SPOON

3.3



COLD SHRINKING WITH HAMMER AND DOLLY



Instructions:

The following reading contains information on the method used in applying plastic filler and solder. Read it carefully then answer the exercises.

Instrucciones:

La siguiente lectura contiene información tocante los modos que se usan para aplicar plástico y soldadura. Léala cuidadosamente y luego conteste los ejercicios.

Vocabulary	Vocabulario
solder	soldadura
plastic	plástico
contour	contorno
tinning	estañar
indentations	dentada
rust	mo[illegible]

Remember the following.
Recuerde lo siguiente.

1. How to prepare and apply solder.
   Como preparar y aplicar soldadura.

2. How to prepare and apply plastic filler.
   Como preparar y aplicar relleno plástico.

Body Solder and Plastic Filler

On door panels, deck lids, hoods, etc, where the inner and outer surfaces are close together, it becomes all but impossible to smooth out the surface without the use of solder or body plastic filler.

Body solder is a tin and lead mixture used to fill indentations. It is also used to reshape panel contours and to seal body seams from water and dust. Body solder comes in various ratios such as 50% tin - 50% lead, or 30% tin and 70% lead. The type of solder used depends on the material being soldered. Solder has the strongest bond to metal, it is however, more costly than plastic fillers. When removing dents, all possible efforts should be made to avoid the use of solder. When soldering,the following steps should be followed:

1. Clean surface - remove paint, rust, oil, etc.
2. Tin area - preheat the area, apply flux followed by tinning coat of acid core solder or tinning acid.
3. Build up - apply body solder to tinning coat until it is higher than original contour.
4. Finishing - allow solder to cool. File and sand until even with original contour of sheet metal.

Plastic fillers come in epoxy resin or polyester. Epoxy resin along with fiber glass cloth is used to repair rusted areas. The polyester resin and a fiberglass cloth are used primarily to fill sheet metal. Both plastic fillers must be mixed with a hardener (catalyst).

Body plastic fillers are preferred most often over body solder. They, however, require more work time. Like solder, plastic fillers should be used only when other methods of repair are insufficient. The following steps are recommended when using plastic filler:

1. Clean surface by removing paint, rust, grease, etc.
2. Mix plastic filler with hardener, using a putty knife. Stir mixture using a side to side wavy motion then repeat to assure complete mixing.
3. Apply to surface in thin coats to assure proper bonding.
4. File filler with hand file to established contour then sand with fine grit sandpaper.

Like others these two repair methods require practice and following the proper steps.

True or False

____1. Solder is a tin-lead mixture used to fill indentations.

____2. All possible efforts must be made to repair the damage before relying on solder or plastic.

____3. Solder is less expensive than body plastic.

____4. Plastic filler requires more work time than solder.

____5. The first step, when using solder or plastic, is to clean surface.

____6. The area to be soldered, after cleaning, has to be tinned.

____7. Body plastic has to be mixed with a catalyst.

____8. Body plastic is often preferred over solder.

List the steps followed when using:

Solder

Body Plastic

Fill in the blanks

p__nel

de__k

t__n

le__d

fl__x

ac__d

c__re

co__to__r

so__d__r

pl__st__c

de__t

s__rfa__e

r__st

fi__ler

Instructions:

The following reading contains information on metal finishing. Read it carefully then answer the exercises.

Instrucciones:

La siguiente lectura contiene información tocante el proceso que se usa para darle la última mano al metal. Léala cuidadosamente y luego conteste los ejercicios.

Vocabulary	Vocabulario
grind	pulir
file	lima
cross	trazar
buff	pulimentar
level	plano
picking	picadura

Remember the following.
Recuerde lo siguiente.

1. The grinding methods.
   los métodos de pulir.

2. The filing methods.
   Los métodos de alisar.

Metal Finishing

Damaged panels, which have been roughed out, are ready to undergo the final stage of the metal repair process. Metal finsihing, is the most crucial stage in auto body repair because irregularities, no matter how minor, must be removed. If the process is not properly carried out these irregularities will show up after panels have been painted.

Plastic filler may also be applied during the metal finishing process to smooth out any irregularities. After the panel appears to be completely smooth, the repairman proceeds to finalize the process by grinding and filing.

Various grinding methods may be used to locate and level irregularities, such as high or low spots. Grinding discs having different degrees of coarseness are used in this process. The following are grinding methods:

1. Buffing is used primarily for removing paint. It is accomplished by moving the grinder in an up down movement. A 16 grit open coat disc is used because it prevents paint buildup on disc.
2. Crosscutting is primarily used to level rough spots. This method requires grinder movement in a left to right manner and uses a 16 or 24 grit closed coat disc.
3. Polishing is used to give final smoothness to the panel after all irregularities are removed. Grinding discs from 50 grit up are used for this purpose.

Filing is also used to locate and remove irregularities and to level materials such as solder or plastic filler. Filing methods are:

1. Cross Filing - consists of filing in one direction followed by a second filing over the first at a 45° angle.
2. X Filing - consists of filing in one direction followed by a second filing across the first at a 90° angle.
3. Line Filing - is simply filing in one direction.

The pick hammer is used in conjunction with filing and grinding. High or low spots, which cannot be removed by grinding or filing, are pounded out with the pick hammer.

The repairman must remember how crucial this stage of repair is. Any irregularities, even sanding scratches, will show up after the panel is painted.

Fill in the blanks

1. _____is done with a _____grit open coat grinding disc with an ____- _____movement of the grinder.

2. _____is used to level and _____out rough spots.

3. The final grinding method which uses a _____grit open coat disc is called _____.

4. Filing in one direction only is called _____filing.

5. Filing done on one direction followed by a _____° cross filing is called _____.

6. Filing in one direction followed by a second pass at a 45° angle is called _____filing.

7. _____helps correct _____or low spots which _____ be removed by grinding or filing.

8. Damaged panels which have been _____out are then prepared for _____.

g__in__ing
bu__fi__g
g__it
f__le
li__e
fi__is__ing
d__s__
sm__ot__
d__rection
p__c__ing
st__ik__ng
p__li__hi__g

True or False

____1. There are four grinding methods.

____2. Crosscut grinding uses 16 or 24 close coat grinding disc.

____3. Polishing with a grinder requires a 50 grit open coat disc.

____4. The primary function of buffing is to remove paint.

____5. Filing is done in one direction only.

____6. Files are used to locate and remove irregularities found on metal.

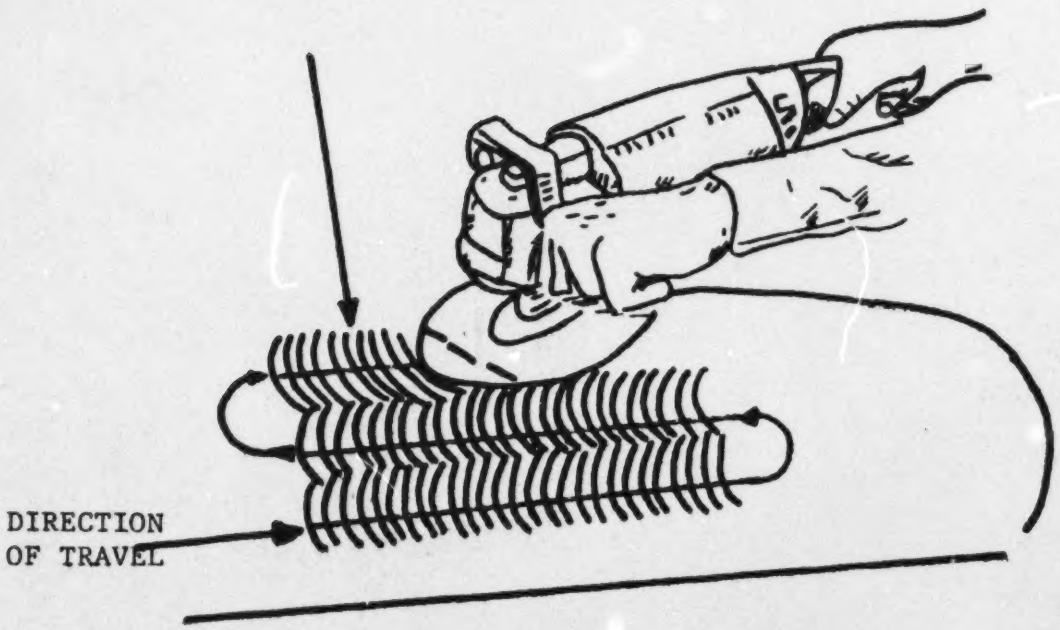
____7. There are three filing methods.

____8. Line filing is filing in one direction only.

____9. Plastic filler may be applied during the metal finishing process

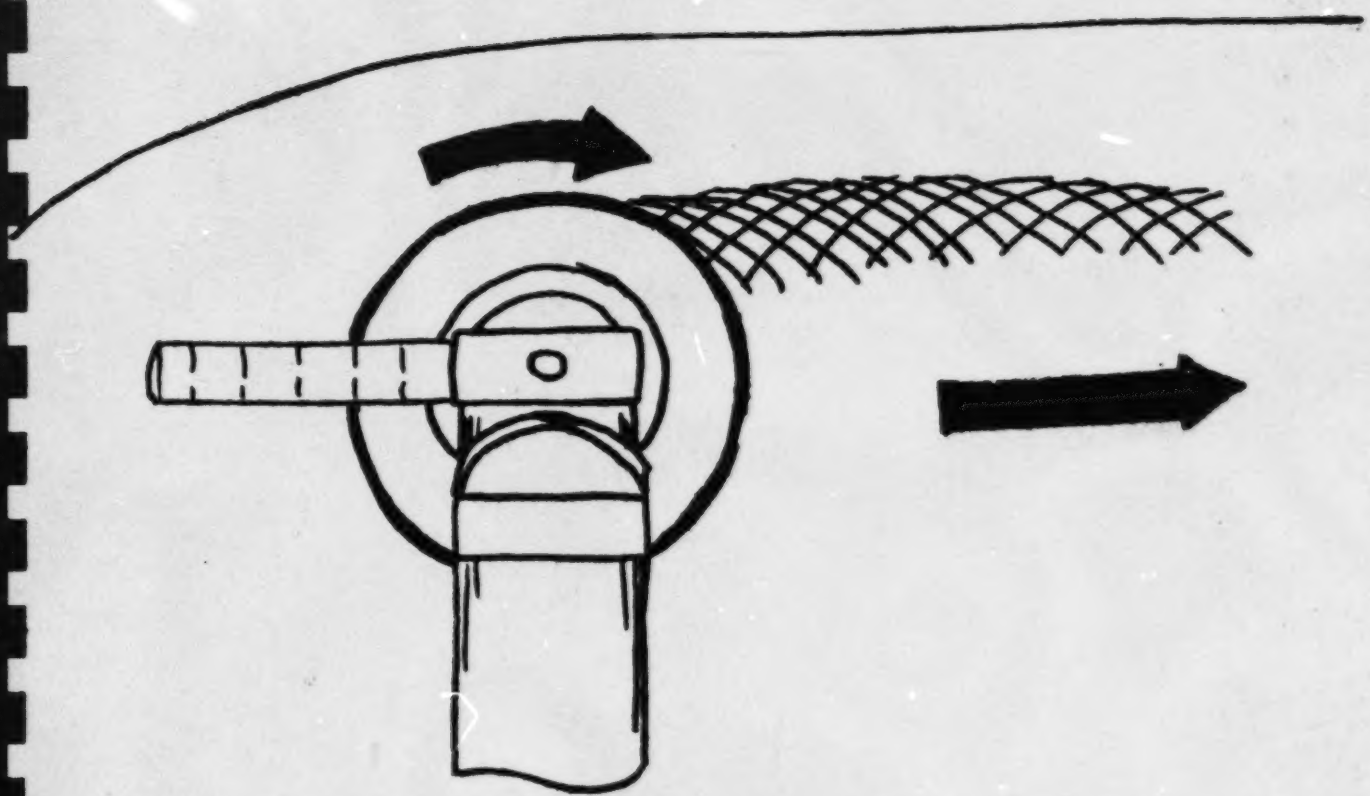
___10. Metal finishing consists of leveling and smoothing out panels by grinding, filing and picking if needed.

BUFFING

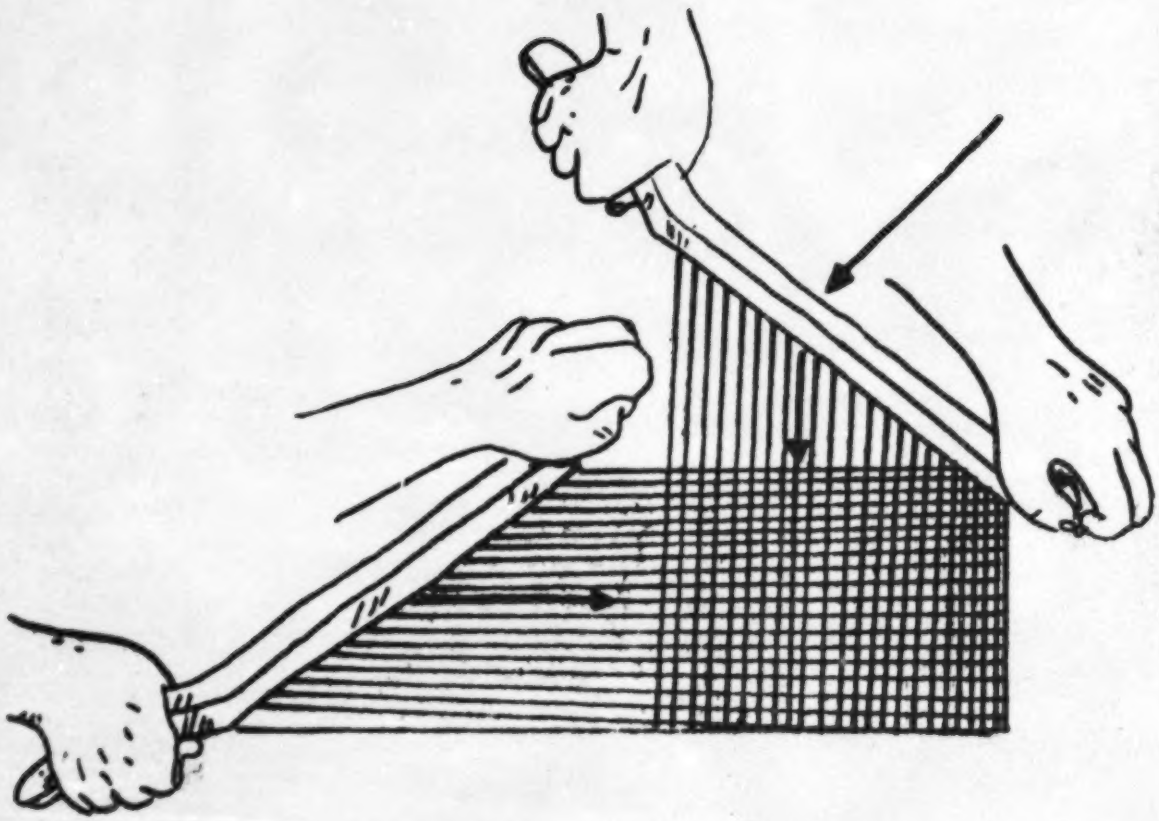


UP AND DOWN MOVEMENT

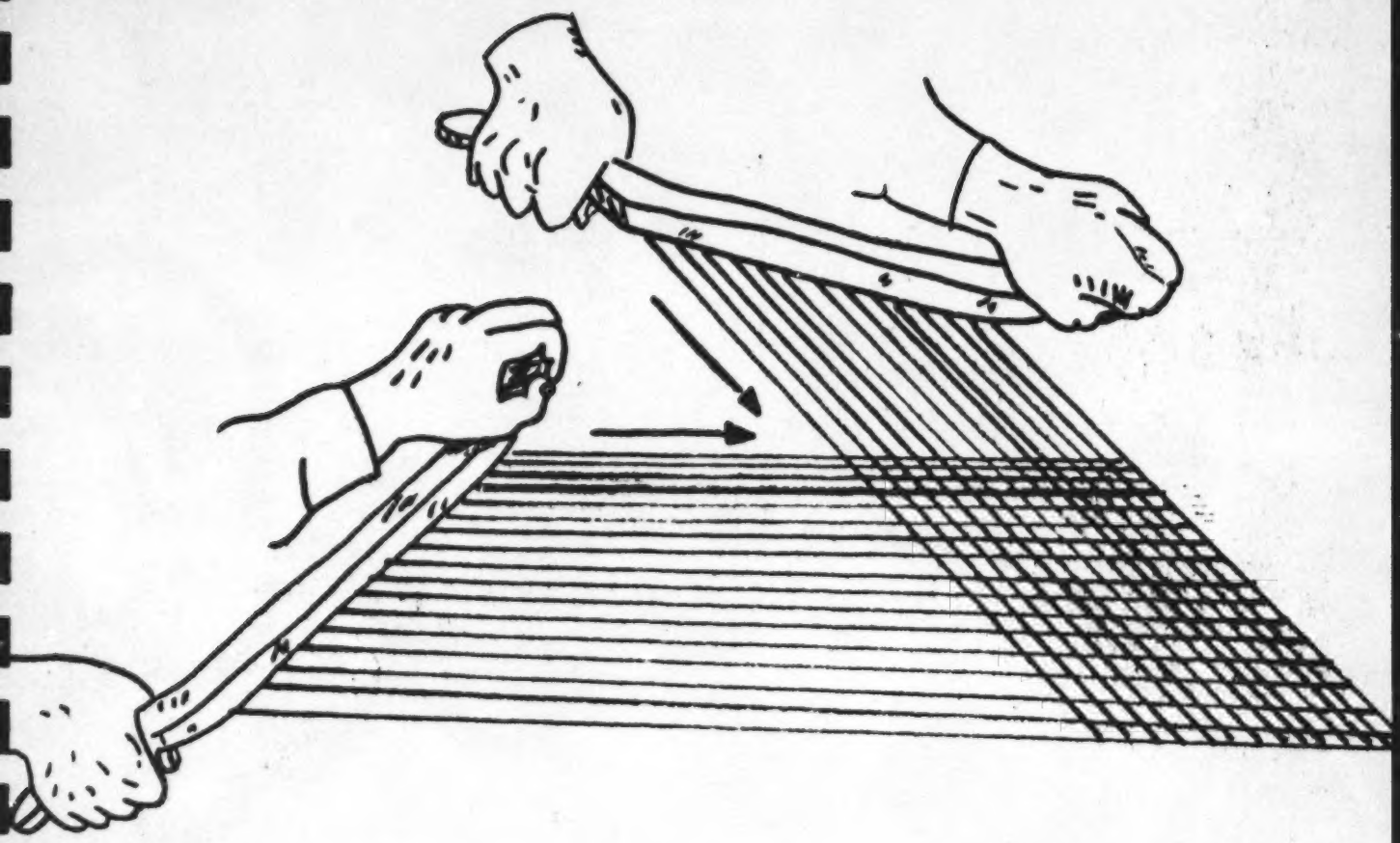
CROSSCUTTING



CROSS FILING



X FILING



POST-TEST 3.0

Basic Metal Repair

Surface Preparation

_____Assess
_____Exterior Surface
_____Interior Surface
_____Under Surface
_____Under Coating
_____Surface Preparation

A. refers to the cleaning and removing of foreign objects on metal; also includes removal of hardware and trim.
B. process which must be done before attempting to repair damages.
C. exposed panel walls which are visible only from certain angles.
D. a panel's outer side which is easily seen.
E. a panel's inner side which is not visible unless parts are removed.
F. the sticky substance, which is applied at factories, coating under and exterior panels

Damage Analysis & Metal Rough Out

_____Direct Damage
_____Direction of Damage
_____Elasticity
_____Elastic Limit
_____Indirect Damage
_____Rough Out
_____Hammers & Dollies
_____Hammer on Dolly
_____Work Hardening
_____Hammer off Dolly

A. the process used in basic metal repair to return damaged panels to their original dimensions.
B. bending and forming of metal which causes its strengthening or hardening.
C. damage which resulted from direct contact with impact object.
D. refers to point which metal can be stretched and recover without damage.
E. the direction in which the damage traveled from the point of impact.
F. technique which consists of placing the dolly under the damaged area and striking with hammer directly above.
G. the property which allows metal to stretch and return to original form.
H. tools used extensively during rough out proces
I. rolled or hinged buckles caused by traveling impact force.
J. technique which requires placing the dolly close to but not directly under point being struck.

Metal Shrinking 3.0

_____Steel	A. a mixture of iron and carbon molecules.
_____Low Carbon Steel	B. indentations found on shrinking hammers.
_____Molecules	C. these become disarranged in metal as a result of collision or improper repair methods
_____Hot Shrinking	D. considered the best method of straightening metal through the use of heat.
_____Cold Shrinking	
_____Grooves	E. type of steel used for auto body construction
	F. method of metal shrinking which involves striking metal with shrinking hammer.

Body Solder & Plastic Filler

The following are steps which should be followed when soldering; place them in their proper order.

Tin area	1. _____
Finishing	2. _____
Build up	3. _____
Clean surface	4. _____

The following are steps which should be followed when using plastic filler; place them in their proper order.

Mix plastic filler with hardener	1. _____
Clean surface	2. _____
File filler	3. _____
Apply to surface	4. _____

Metal Finishing

_____Metal finishing	A. one of the methods used to locate and level high or low spots; this includes crosscutting
_____Cross filing	B. procedure of filing which consists of filing in one direction followed by a second filing at a 45° angle.
_____Line filing	C. filing done in one direction.
_____Crosscutting	D. the final stage in metal repair process.
_____Polishing	E. process used primarily for removing paint.
_____Filing	F. a second method of locating and removing irregularities and to level solder or plastic filler.
_____Grinding	G. method used to give final smoothness to the panel after all irregularities are removed.
_____Buffing	H. the method of filing in one direction followed by a cross action of a 90° angle.
_____X filing	I. the process used primarily to level rough spots.

Vocabulary	Vocabulario
analyze	analizar
assessment	estimación
avoid	evitar
buckle	encorvadura
bulge	torcedura
buff	pulimentar
capable	capaz
carbon	carbón
catalyst	catalizador
compress	comprimir
contour	contorno
crucial	crítico
damage	daño
deformation	deformación
detergent	detergente
dimension	dimensión
direct	directo
disarrange	desarreglar
elasticity	elasticidad
exterior	exterior
fender	guardafango
file	lima
finalize	finalizar
flux	fundente
foreign	extranjero
grind	afilar, pulir

Vocabulary	Vocabulario
grit	arenilla
groove	ranura, estría
hardware	quincalla
inaccurate	incorrecto
indirect	indirecto
insulation	aislación
interior	interior
iron	hierro
level	plano, nivel
limit	límite
locate	localizar
molecule	molécula
mud	lodo
oxyacetylene	oxiacetilénico
panel	panel
picking	picadura
plastic	plástico
polyester	poliéster
pressure	presión
prevent	evitar
rearrange	volver a arreglar
receive	recibir
remove	remover
resistance	resistencia
rough	imperfectamente
rust	moho
scraper	rascador, raspador

Vocabulary	Vocabulario
scratch	rasguñar
shrink	encoger
substance	substancia
surface	superficie
tar	brea
technician	técnico
technique	técnica
tinning	estañar
trim	adorno
undersurface	superficie de abajo